

WHAT IS CLAIMED IS

1. A rare earth metal-based permanent magnet having a metal oxide film formed on the surface thereof by a sol-gel coating process.
2. A rare earth metal-based permanent magnet according to claim 1, wherein said rare earth metal-based permanent magnet is an R-Fe-B based permanent magnet.
3. A rare earth metal-based permanent magnet according to claim 1, wherein said rare earth metal-based permanent magnet is an R-Fe-N based permanent magnet.
4. A rare earth metal-based permanent magnet according to claim 1, wherein said metal oxide film is formed from a metal oxide component including at least one selected from Al, Si, Ti and Zr oxides.
5. A rare earth metal-based permanent magnet according to claim 1, wherein said metal oxide film is amorphous.
6. A rare earth metal-based permanent magnet according to claim 1, wherein said metal oxide film contains carbon (C).
7. A rare earth metal-based permanent magnet according to claim 6, wherein the content of carbon is in a range of 50 ppm to 1,000 ppm (wt/wt).
8. A rare earth metal-based permanent magnet according to claim 1, wherein the thickness of said metal oxide film is in a range of 0.01 μm to 5 μm .
9. A process for producing a rare earth metal-based permanent magnet, comprising the step of forming a metal oxide film on

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the surface of a magnet by a sol-gel coating process.

10. A process for producing a rare earth metal-based permanent magnet according to claim 9, wherein said metal oxide film is formed from a metal oxide component including at least one selected from Al, Si, Ti and Zr oxides.

11. A rare earth metal-based permanent magnet having a metal oxide film, wherein said magnet has, between said metal oxide film and the entire surface of said magnet, an interfacial layer with R (rare earth element) atom chemically bonded with a film forming metal atom through oxygen atom.

12. A rare earth metal-based permanent magnet according to claim 11, wherein said metal oxide film is formed from a metal oxide component including at least one selected from Al, Si and Ti oxides.

13. A rare earth metal-based permanent magnet according to claim 11, wherein said interfacial layer is formed by forming the metal oxide film on the surface of the magnet by a sol-gel coating process.

14. A process for producing a rare earth metal-based permanent magnet, comprising the step of forming a metal oxide film on the surface of a magnet by a sol-gel coating process, thereby forming, between said metal oxide film and the entire surface of said magnet, an interfacial layer with R (rare earth element) atom chemically bonded with a film forming metal atom through oxygen atom.

15. A process for producing a rare earth metal-based permanent

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magnet according to claim 14, wherein said metal oxide film is formed from a metal oxide component including at least one selected from Al, Si and Ti oxides.

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